Northumbria Research Link

Case Note

The Forbidden Chains of Probabilistic Reasoning

R v Ben Belhaj-Farhat [2022] EWCA Crim 115

Keywords

On 23rd July 2020, a burglary took place at a flat in West London. That flat was located on the third floor of a residential block. At the time of the burglary, the building was surrounded by scaffolding. The occupiers had previously been asked by the site manager to leave the windows to their flat unlocked as the builder would be on-site and would require access. The flat in question was occupied by three people. The last of the three occupiers of the flat left the property at about 2.30 pm, leaving it empty. When she returned at about 3.15 pm, she discovered that the flat had been burgled. Items were missing from the flat, and she found a cigarette roll-up propped up against a frame on the front door inside the flat. This was handed to a scene of crime officer. All three occupants of the flat confirmed that it was not their cigarette. Upon forensic examination, the 'cigarette roll-up was found to contain the appellant's DNA' (at [6]).

The prosecution case was that the presence of the cigarette butt 'containing the appellant's DNA' meant that the appellant was the burglar. The evidence adduced in support of this case was: first, agreed evidence in respect of the cigarette and DNA; secondly, bad character evidence admitted by the judge on a contested application that went to propensity; and thirdly, adverse inferences from a failure by the appellant to answer questions in interview.

The defence case was that there were too many uncertainties surrounding how the cigarette butt may have got into the premises. The counsel for the appellant submitted that a DNA profile on such a readily moveable object as a cigarette at the crime scene was of insufficient probative value to establish a case to answer when the premises had been left insecure, builders had had access, and the scaffolding alarm had not been activated. Although it was acknowledged that there was a very strong inference that the cigarette had been dropped during the burglary, and given the DNA match and that therefore the jury could be sure that the DNA on the cigarette came from the appellant, there was no other evidence to link the appellant to the offence.

The Crown Court judge gave two rulings on the subject matter. The *first* ruling was on 2nd June 2021 in relation to the application by the prosecution to adduce evidence of the appellant's previous convictions for burglary and theft in 2014, 2017 and 2019. The prosecution sought to use the gateway under section 101(1)(d) of the Criminal Justice Act 2003, namely that it was relevant to an important matter in issue between the defendant and the prosecution. In her ruling, the judge ruled that 'the presence of the cigarette butt left at the scene, containing the appellant's DNA, was strong evidence against the appellant' (at [10]). This was not a case where the Crown were seeking to rely on weak evidence by bolstering it with adducing evidence of the appellant's previous convictions. The *second* ruling, on 3rd June 2021, was on a submission of 'no case to answer' made on behalf of the appellant. The defence had relied upon the second limb of *Galbraith*, namely that the evidence relied on by the prosecution was so tenuous in nature that a jury properly directed could not convict upon it. The judge ruled that there was a case to answer (on count 2).

The appellant was convicted of one count of burglary, pursuant to section 9(1)(b) of the Theft Act 1968 (count 2 on the indictment). He was acquitted of another count of attempted burglary (count 1). On 15th July 2021 he was sentenced to a term of three years' imprisonment for the offence on count

2 (the minimum mandatory sentence required, pursuant to section 314 of the Sentencing Act 2020, given his previous convictions). The offence of which the applicant was convicted had occurred during the two-year operational period of a suspended sentence order of two years' imprisonment. That sentence had been imposed on 18th September 2019 for an offence of burglary and for an offence of assault by beating an emergency worker. The sentence for the latter offence was a concurrent term of three months' imprisonment, which was also suspended. The sentence of imprisonment for the burglary only was activated, with a reduced term of 18 months. It was ordered to run consecutively to the sentence for the burglary on the instant indictment. The overall sentence was, therefore, one of four and a half years' imprisonment.

There were two grounds of appeal. *Firstly*, it was said that the judge erred in not acceding to the submission of no case to answer at the conclusion of the prosecution's case. The *second* ground was that the judge erred in allowing the prosecution to adduce evidence of the appellant's bad character in respect of the previous convictions for burglary.

Held, by dismissing the appeal, that the bad character evidence had been properly admitted by the judge. The submission that the bad character evidence was admitted to bolster a weak case was thus rejected. With regards to the submission of no case to answer, which formed the other ground of appeal, the Court stressed that the evidence must be taken as a whole. In this case, 'the chances of the DNA not being that of the applicant was 1 in 1 billion' (at [32]). The appellant's previous convictions were evidence in the case, even though they constituted bad character evidence. Therefore, in assessing the weight of the evidence against the appellant, the judge would have been entitled to take this bad character evidence into account too. The DNA evidence on the cigarette butt did not have to be weighed in isolation from everything else when she was considering the submission of no case to answer. The location and timing of the discovery of the cigarette butt were important components of that evidence.

Commentary

The Persistence of Logical Fallacies

R v Ben Belhaj-Farhat is the latest in a series of cases in which there was no individualised piece of evidence against the appellant. The most interesting aspect of this case is the question of whether *two* pieces of probabilistic evidence, that is, (a) a matching DNA profile and (b) evidence of bad character, can provide a safe basis for conviction. Following *Hanson* which is the classic authority on the admissibility of evidence of bad character, 'the judge must always consider the *strength* of the prosecution case. If there is no or very little other evidence *against a defendant*, it is unlikely to be just to admit his previous convictions, whatever they are' (*R v Nicky Hanson* [2005] EWCA Crim 824, at [10], emphasis added). *Admissibility* of bad character evidence is thus a function of the strength of the rest of the evidence: 'Evidence of bad character cannot be used to simply bolster a weak case, or to prejudice the minds of a jury against a defendant' (*Hanson*, at [18]). As Fraser J. correctly identified, '[w]hether there is a strong case, or, put another way, a weak case based solely on the DNA evidence, falls to be considered by this court when considering that ground of appeal', at [22].

Evidence of bad character can thus be admitted, but only when there is *already* a strong case against the appellant. Now, the question is: What were the (other) facts of this case? And how strong was their probative force? To clarify this point, the reasoning process on which this judgment relies, merits detailed discussion. Fraser J. noted that 'there was no question of a mixed match' and that 'the appellant *was the sole contributor*' (at [29], emphasis added), which echoes the Crown Court judge's approach, according to whom 'the presence of the cigarette butt left at the scene, *containing the appellant's DNA*, was strong evidence against the appellant' (at [10], emphasis added). The evidential basis for the proof of source was, as Fraser J. noted, 'agreed evidence in respect of the cigarette and DNA', that is, 'Agreed Fact 1' (at [7] and [14]).

Agreed upon was that (a) 'a match was found between the DNA on the cigarette [i.e. the forensic sample] and the [appellant, i.e. the evidence sample], and that (b) 'the estimated likelihood of a match

if the DNA originated from someone other than the [appellant] was one in a billion', at [14], emphasis added (note that this is a conventional upper limit. To avoid exorbitant numbers which lack meaning (e.g.: 1 in 1 quintillion), in England and Wales likelihood ratios are capped, See The Royal Society, *Forensic DNA Analysis - A Primer for Courts*, 2017, p. 17). Knowingly, the devil lies in the details. For there is a big distance, indeed an inferential gap, between a *match* (even one with a very low likelihood ratio/random match probability) on the one hand and *sufficient* proof of source on the other hand. The Court of Appeal equated the two when their Lordships and Ladyship accepted that the 'appellant was the sole contributor'. There was indeed expert evidence with regards to the question of whether the DNA evidence was a mixed match or whether it came from a sole contributor. However, the fact that this was not a mixed DNA profile does not suffice to prove that B-F, to the exclusion of all other people on the planet, was the forensic sample's source. A DNA profile is *statistical* in nature. As such it does not inform us about the appellant qua individual human being. The appellant is evidentially articulated only through his membership to a reference class. Why would anyone treat the appellant in this or that way let alone convict him, simply because of the latter's membership to a reference class? Notwithstanding *Tsekiri* ([2017] EWCA Crim 40), the rule according to which DNA evidence qua biostatistical data alone cannot warrant a group-to-individual inference, is an *inferential* one. We simply cannot single out the appellant as the source of the DNA to the exclusion of all others insofar, as we lack *individualistic* evidence –regardless of how low the likelihood ratio might be.

A clue as to why the Court of Appeal thought it *was* warranted to individualise the DNA profile (which, again, is statistical in nature) might lie in what Fraser J. observed elsewhere: 'this was a strong case […] One need only to re-read Agreed Fact 1 […] In this case, the chances of the DNA not being that of the applicant was 1 in 1 billion', (at [32]).

We saw above that according to 'Agreed Fact 1' the estimated likelihood of the match '*if* the DNA originated from someone other than the [appellant] was one in a billion' (at [14], emphasis added). This refers of course to the probability of the evidence *given* a contrastive set of propositions which conventionally map on the propositions of the parties. This structure pertains to the very logic of evaluative reports which even according to the ENFSI Guideline 'should address the probability of the findings given the propositions and relevant background information and not the probability of the propositions given the findings and background information' (European Network of Forensic Science Institutes, Guideline for Reporting in Forensic Science, 2010, p. 10 et passim). By saying that this was a case where 'the chances of the DNA not being that of the applicant was 1 in 1 billion', the Court of Appeal committed the so-called prosecutor's fallacy where conditional probabilities are being transposed (see only W. C. Thompson & E. Schumann, Interpretation of statistical evidence in criminal trials. In: 11 *Law and Human Behavior* (1987), pp. 167–187; Peter Donnelly and David J. Balding, The prosecutor's fallacy and DNA evidence, in *Criminal Law Review* 1994, pp. 711-721 (716)). To put it in analytic terms, Fraser J.'s remark can be translated into the following proposition:

- the chances → LR
- of the DNA not being that of the applicant → LR = p (¬H|e) / p(H|e)
- being 1 in 1 billion → $1:1\times10^9$.

Fraser J. used the likelihood ratio (chances) for the evidence (probability of the DNA profile given the parties' propositions) to address, and quantify, the source-level proposition (probability of the appellant not being the source given the evidence, that is, the probability of an innocent explanation). The figure that equals $1:1\times10^9$ is 'p(e|H) / p(e|¬H)', that is, the probability of the evidence given the parties' propositions which the forensic expert needs to take for granted. The Court of Appeal committed thus the prosecutor's fallacy by transposing the conditional probability and by holding that the LR for the evidence (1:1 billion) has the same arithmetic value as the probability of the appellant not being the source of the forensic sample. To put it in a slightly different way, consider the following two questions:

Q_1. What is the probability that the appellant's DNA profile will match the profile from the crime sample, assuming that he is innocent?

Q_2. What is the probability that the appellant is innocent, assuming that his DNA profile matches the profile from the crime sample?

The Court of Appeal used the answer to Q_1 (LR, as provided by Agreed Fact 1) as the answer to Q_2 which was of direct relevance to the court. The routinely committed prosecutor's fallacy tends to be trivialised by the Court of Appeal which treats the likelihood ratio and the significance of committing the prosecutor's fallacy as inversely proportionate. In *Doheny and Adams* ([1997] 1 Cr App R 369, at 379A) Phillips LJ observed that '[t]he more remote the random occurrence ratio, the less significant will be the adoption of the "prosecutor's fallacy"', until the point is reached where that fallacy does not significantly misrepresent the import of the DNA evidence'. What is important to understand, the same court observed elsewhere, is 'the effect of the fallacy on the safety of the verdict' (*The Queen v C.* [2011] EWCA Crim 1607, at [46]).

The effect of transposing the conditional on *this* particular case seems, however, to have been substantial insofar, as Fraser J. inferred that B-F 'is the sole contributor', and that, ultimately, the absence of an innocent explanation meant that this was 'a strong case' at [30], with the consequence of admitting evidence of bad character.

Bad Character

We saw above that the prosecution sought to use gateway (d) as the basis of an argument that the appellant's disposition to commit offences of the kind charged, makes it more likely than not that he is guilty. As outlined above, the effect of *Hanson* is that such evidence is admissible when there is *already* a *strong* case – independently of evidence of bad character which, I remind, 'cannot be used simply to bolster a weak case' (*Hanson* at [18]). At the same time, however, the Court of Appeal accepts that evidence of bad character will serve the purpose of providing a 'comparatively slight nexus' between the defendant and the alleged crime, which will corroborate the probabilistic DNA evidence and establish a case to answer (*R v Doheny and Adams* [1997] – quoted in *R v FNC [2015]* EWCA Crim 1732, at [20]. *FNC* was quoted in *Ben Belhaj-Farhat* at [27]. For more discussion see Tony Ward, DNA evidence alone as a case to answer, in 80 *J. Crim. L.* 2016, pp. 7–10). What is more, in *Darnley* ([2012] EWCA Crim 1147–21 prior convictions), a case cited and applied in *Bryon*([2015] EWCA Crim 997–1 prior conviction with a characteristic modus operandi), Elias LJ remarked that '[i]n our judgment, therefore, the bad character evidence could also be properly admitted on the basis that it provides evidence of propensity and that it was not unfair to admit the evidence even if there would have been no case to answer without it' (*Darnley*, at [32]). Which one is it then? Following *Hanson*, bad character evidence presupposes a strong case. Following *Darnley* and *Bryon,* such evidence can be admissible even when there is no case to answer. These two cases are hard to reconcile with each other. It should be mentioned, however, that *Darnley* and *Bryon* were decided at a time when, following *Lashley* (8 Feb. 2000, unreported), a DNA profile as a sole item of evidence could *not* constitute a case to answer. *Darnley* cited with approval a remark by Professor Spencer who, in his monograph on bad character evidence, had written that, save for an uncorroborated 'fleeing glance' identification, there should be, in principle, no reason to exclude evidence of disposition (*Darnley*, at [32]. See J.R. Spencer, *Evidence of Bad Character*, 2/e, para 4.58, (para 1.70 in the 3/e); M. Redmayne, *Character in the Criminal Trial*, 2015, p. 163). As Elias LJ remarked, adopting the said observation, 'the concept of weak evidence referred to in *Hanson* should be limited to evidence which links the defendant to the offence but which the courts would normally treat with caution' (*Darnley*, at [32]). We need to pay attention to the details of Elias LJ's remark. Neither a DNA profile nor evidence of bad character 'link' the appellant qua unique individual with an offence. As outlined above, these types of evidence are *probabilistic* in nature. Probability, as the historian of science James Gleick explains, 'is about ensembles, not individual

events' (James Gleick, The Information, Fourth Estate 2011, p. 329). The evidence links the alleged offence with a reference group to which the appellant belongs, not with the appellant himself. These two things are (by definition) not the same.

Propensity does *not* warrant an individualised inference insofar, as it is itself probabilistic in nature. It informs us about the reference class of all possible offences of the same description as the one charged, or offences of the same category as the one charged. In other words, propensity does not yield an inference about that particular (alleged) offence – a point reflected in Rose LJ's 'general observation' that 'although the convictions may show a propensity this does not mean that he has committed *this* offence or been untruthful in *this* case' (*Hanson*, at [18], emphasis added). Regardless of the issue of admissibility of bad character evidence, by juxtaposing two group-mediated (probabilistic) pieces of evidence (i.e. a DNA profile and evidence of bad character) the prosecution can only create an increasingly smaller reference class. The resulting probability will, however, still not be able to refer to the *specific case*. Statistical data or probabilistic statements which would be regarded as valid only with regards to a single observation contradict the very concept of statistical *explanation* which needs to be *general* in scope. Deploying reference classes containing a single member does not eliminate subjectivity or uncertainty, but merely distracts us from the very problem of decision-making. A reference class, whose granularity supposedly reaches the maximum level so that it contains a single member/observation, can only be perceived as a 'joke' (E. Sober, *Evidence and Evolution*, Cambridge 2008, p. 90).

It is therefore submitted that a DNA profile or evidence of bad character are not (intrinsically) weak or strong. What is informative is not the evidence as such but its interpretability for practical purposes. For example, the evidence of 21 previous convictions for burglary over a period of 30 years (see *R v Darnley*) is as strong as it could ever be as regards the issue of propensity. The same evidence (either as a sole item of evidence or in conjunction with other group-mediated evidence) is, however, inconclusive as regards the particular case. It is in *Hanson*'s terms 'no evidence' against the defendant, for the simple reason that probabilistic evidence is not about a particular case, but relates to a series of events, that is, to the group of people whose DNA would/does match the forensic sample. Regardless of whether there are two or more (possibly: infinitely many) probabilistic (group-mediated) pieces of evidence, there can be no *single-case probability* or a reference class with a single member only. No intersection of the relevant reference classes could 'tip the scales' (Spencer, *Evidence of Bad Character*, para 1.66) and warrant an inference to the individual. Statistical evidence or even a combination thereof cannot, even at its highest, provide a safe basis for conviction.

To paraphrase Lord Hailsham who described reliance on bad character as 'the forbidden chain of reasoning' (*DPP v Boardman* [1975] A.C. 421), we can talk here about the forbidden chains of probabilistic reasoning. Evidential strength and weakness, that is, the fulcrum point on which – all things being equal – the admissibility of bad character evidence will turn, are surface features of a deeper evidential structure. Of importance is the individualistic or group-mediated character of the evidence. Evidential strength is a function of individualised evidence – not vice versa.

Acknowledgements

Declaration of Conflicting Interests

The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: The author is the Founder and Director of Expert Evidence Consulting Ltd. and offers advice on DNA evidence.

Kyriakos N. Kotsoglou